

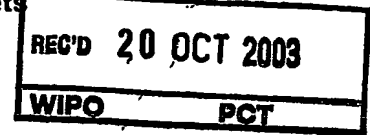


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02292734.7

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Bezeichnung der Erfindung/Title of the invention/Titre de l'invention:
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Cartridge for protecting a data carrier

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Cartridge for protecting a data carrier

FIELD OF THE INVENTION

5 The present invention relates to a cartridge for protecting a data carrier in a dirty and damaging environment.

The present invention also relates to device for processing said cartridge and to a recording and/or reproducing device comprising said processing device.

This invention is particularly relevant for optical discs and more particularly to small form factor optical SFFO discs.

10

BACKGROUND OF THE INVENTION

Conventional disc cartridges can be relatively thick. They typically have a thickness of at least 2 to 3 times the disc thickness. Such a cartridge is described, for example, in the US patent n°4,879,710.

15

As we are mainly considering a small form factor optical SFFO drive application here, a disc has dimensions of roughly 30 mm diameter and 0.5 mm thickness. Taking into account the best plastic moulding technology, one would end up by adding two times 0.3 mm of plastic cover, two times an air gap of typically 0.2 mm and maybe even a slider to open the cartridge. This would give a cartridge thickness of about 1.5 to 2 mm.

20

SUMMARY OF THE INVENTION

It is an object of the invention to propose a cartridge for protecting a small form factor optical disc in a dirty and damaging environment, which has a very low contribution to the height of the device for processing the data carrier, i.e. the disc drive.

25

To this end, the cartridge in accordance with the invention comprises two flexible halves for protecting the data carrier. Said flexible halves comprise means for disassembling said halves when the data carrier is inserted in a device for processing said data carrier and for reassembling the halves when the data carrier is removed from said device.

30

Thanks to the disassembling-reassembling means, the cartridge halves can be separated outside the device for processing the data carrier. As a consequence, only the data carrier is inserted in said processing device and contributes to the height of the processing device.

In a first embodiment, the halves are rolled up thanks to rolling up means included in the cartridge or in the processing device.

35

In another embodiment, the halves are stored locally by shifting them into two compartments around the processing device.

When the data carrier is in the cartridge, the two cartridge halves are held together thanks to the disassembling-reassembling means such as an adhesive layer, plastic bonded ferrite material combined with a ridge and counter-ridge, or a zipper-like structure.

5 **BRIEF DESCRIPTION OF THE DRAWINGS**

The present invention will now be described in more detail, by way of example, with reference to the accompanying drawings, wherein:

- Fig. 1 depicts how an optical disc contained in a cartridge is inserted in an optical drive, according to a first embodiment of the invention,
- 10 - Fig. 2 illustrates the operation of rolling up means in accordance with the first embodiment of the invention,
- Fig. 3 is a perspective view of the cartridge and its corresponding processing device in accordance with the first embodiment of the invention,
- Fig. 4 depicts how an optical disc contained in a cartridge is inserted in an optical drive, according to a second embodiment of the invention,
- 15 - Fig. 5 is a perspective view of the cartridge in accordance with the invention,
- Fig. 6 shows an example of means for disassembling and reassembling the halves of a cartridge using adhesive strips,
- Figs. 7a and 7b show two examples of means for disassembling and reassembling the halves of a cartridge using magnetic strips, and
- 20 - Fig. 8 shows an example of means for disassembling and reassembling the halves of a cartridge using a zipper-like structure.

25 **DETAILED DESCRIPTION OF THE INVENTION**

25 The present invention relates to a cartridge for a data carrier of the small form factor optical SFFO disc type, for example. Said cartridge comprises two flexible halves for protecting the data carrier. It will be apparent to a person skilled in the art that the invention is not limited to SFFO discs but remains applicable for cartridges able to contain all types of data carrier that are exposed to a dirty and damaging environment.

30 The halves of the cartridge in accordance with the invention are disassembled when the data carrier is inserted in a device for processing the data carrier and reassembled when the data carrier is removed from said device. The processing device is, in the case of an optical disc, an optical drive.

35 Fig. 1 depicts an optical drive (1) having a loading space (2) through which a disc can be loaded. The loading space has two rollers (2a-2b) onto which the flexible halves of a cartridge (4) containing a disc (3) may roll up. Doing this inserts the disc automatically into

the optical drive. At the same time, the thin flexible halves that surround the disc are stored onto the rollers.

5 An important aspect of the invention is that the cartridge is made of a flexible, transparent or non-transparent material like rubber, plastic or an equivalent material. In order to be robust, the material is wear resistant and may or may not be covered with special protecting layers.

10 An advantage of the present invention is that the cartridge covering the disc does not enter the disc drive or is stored in a small part of said disc drive. The building height of the drive can then be reduced with respect to a solution with a conventional cartridge technology. Moreover, the cartridge halves roll up just outside the disc drive, thereby taking a minimum of space.

15 For a small form factor optical drive, the present invention typically aim at a building height of the complete drive of 5 mm, which is also the height of PCMCIA type II and Compact Flash type II interfaces. By using highly miniaturized optical and mechanical components, this can be realized using conventional cartridge technology. By applying a cartridge in accordance with the present invention, this is easier to attain, and ultimately the 5 mm barrier can be lowered towards 4 to 3 mm building height, whereas a compact flash type I has a building height of 3.3 mm.

20 Another advantage of the present invention is that the complete surface of the cartridge may be available for labelling purposes.

25 In a specific embodiment of the invention, the rolling up means (2) are an intrinsic part of the optical drive (1), and comprises means for grabbing the halves of the cartridge in order to roll them up. The grabbing means are, for example, a groove (6) designed within the rollers as described in Fig. 2 and in the perspective view of Fig. 3, said groove being able to receive a corresponding grip (7) of the halves. The rolling up means are supplied by conventional electric means (5).

30 In another embodiment of the invention, the rolling up means (2) are an intrinsic part of the cartridge.

Still in another embodiment of the invention, depicted in Fig. 4, the two flexible halves covering the disc are stored locally without rolling them up. In our example, the halves are shifted into two compartments (10a-10b) outside the drive (1) thanks to the use of a roller (9a,9b), which is able to guide each half linearly.

35 Fig. 5 is a perspective view of a cartridge comprising a flexible plastic cover (4a,4b) into which the disc (3) is placed like, for example, in an envelope. The disc (3) is taken out

of the cartridge by rolling up or shifting the two flexible plastic sheets (4a-4b), as it has been described previously. Typically, the two halves are sealed at the back-end (11) of the cartridge.

5 The cartridge shown in Fig. 5 is made more robust when the two cartridge halves (4a-4b) stick together when carrying the cartridge around. Indeed if the cartridge is held in the pocket of a pair of trousers, the sides are not allowed to fold up, as it will expose the disc to dust and make it more sensitive to damage.

10 In a specific embodiment of the invention, the cartridge halves (4a-4b) are held together by some adhesive layer. In Fig. 6, each half of the cartridge comprises shaded areas (14a,14b), which are sticky strips in this case.

In another specific embodiment of the invention, also represented in Fig. 6, a ridge (12) is made in the front-end of a first half of the cartridge, said ridge corresponding to a counter-ridge (13) in the second half of the cartridge, the ridge and counter-ridge being
15 such that the cartridge halves cannot shift with respect to each other.

In another specific embodiment of the invention, the halves are held together by magnetic force instead of adhesive layers. The shaded areas in Fig. 6 (14a-14b) are then made of, for example, plastic bonded ferrite. This material is flexible and is widely used in, for example, magnetic seals of doors of refrigerators. This material is magnetized to form
20 magnetic strips. In order to increase the sticking force of these magnetic strips, it is advantageous to apply a magnetic pattern in one or both strips. In a specific embodiment the magnetic patterns in both strips coincide, as shown in Fig. 7a in which an arrow is indicating the direction of magnetization, and form a periodic pattern along a length direction of both strips. In another embodiment, a periodic strip is made in one of the strips
25 and the other strip is made of a soft magnetic material as shown in Fig. 7b. It will be apparent to a person skilled in the art that other patterns over the length and width directions of the strips can be envisioned to have an optimized sticking force.

In another specific embodiment of the invention, the cartridge comprises a zipper-like mechanical structure as shown in Fig. 8. Here a front ridge is defined using a ridge (15)
30 over most of the front edge, said ridge being made in the first half of the cartridge, and a corresponding counter-ridge (16) in the second half of the cartridge. A side of the halves of the cartridge are held together using small protuberances (17a) and cavities (17b) that fit together. Fig. 8 schematically shows a zipper-like structure to open and close the cartridge. As is not shown in this figure, but in reality is often the case is that both halves come loose
35 when they are bend. This is the basic principle of 'zipper' mechanism.

Any reference sign in the following claims should not be construed as limiting the claim. It will be obvious that the use of the verb "to comprise" and its conjugations do not exclude the presence of any other elements besides those defined in any claim. The word "a" or "an" preceding an element does not exclude the presence of a plurality of such elements.

CLAIMS

- 1 A cartridge (4) for a data carrier (3) comprising two flexible halves (4a-4b) for
protecting the data carrier, said flexible halves comprising means for disassembling said
5 halves when the data carrier is inserted in a device (1) for processing the data carrier and
for reassembling the halves when the data carrier is removed from said device.
2. A cartridge (4) as claimed in claim 1, further comprising means for rolling up (2a-2b)
the flexible halves.
- 10 3. A cartridge (4) as claimed in claim 1, wherein the disassembling-reassembling
means (14a-14b) comprises adhesive layers.
- 15 4. A cartridge (4) as claimed in claim 1, wherein the disassembling-reassembling
means (14a-14b) comprises a magnetised plastic bonded material.
- 20 5. A cartridge (4) as claimed in claim 1, wherein the disassembling-reassembling
means comprises protuberances (17a) and cavities (17b), able to make the halves of the
cartridge fit together.
- 25 6. A cartridge (4) as claimed in claim 1, wherein the disassembling-reassembling
means (14a-14b, 17a-17b) comprises a ridge (12, 16) and a counter-ridge (13, 15).
- 30 7. A device for processing (1) a cartridge (4) for a data carrier (3) comprising two
flexible halves (4a, 4b) for protecting the data carrier, the flexible halves comprising means
for disassembling said halves when the data carrier is inserted in the processing device the
data carrier and for reassembling the halves when the data carrier is removed from the
processing device, the processing device comprising means for receiving (2a-2b, 9a-9b-10a-
10b) the flexible halves.
- 35 8. A processing device (1) as claimed in claim 7, wherein the receiving means
comprises means for rolling up (2a-2b) the flexible halves.
9. A processing device (1) as claimed in claim 7, wherein the receiving means
comprises means for shifting (9a-9b) the flexible halves in two compartments (10a-10b).

10. A recording and/or reproducing device comprising a processing device (1) as claimed in claim 7.

Cartridge for protecting a data carrier**ABSTRACT**

The present invention relates to cartridge (4) for a data carrier (3) comprising two flexible halves (4a-4b) for protecting the data carrier. The flexible halves comprise means for disassembling the halves when the data carrier is inserted in a device (1) for processing the data carrier and for reassembling said halves when the data carrier is removed from said device. In an embodiment of the invention, the cartridge halves roll up thanks to rolling up means (2a-2b) included in the cartridge or in the processing device.

Reference: Fig. 3

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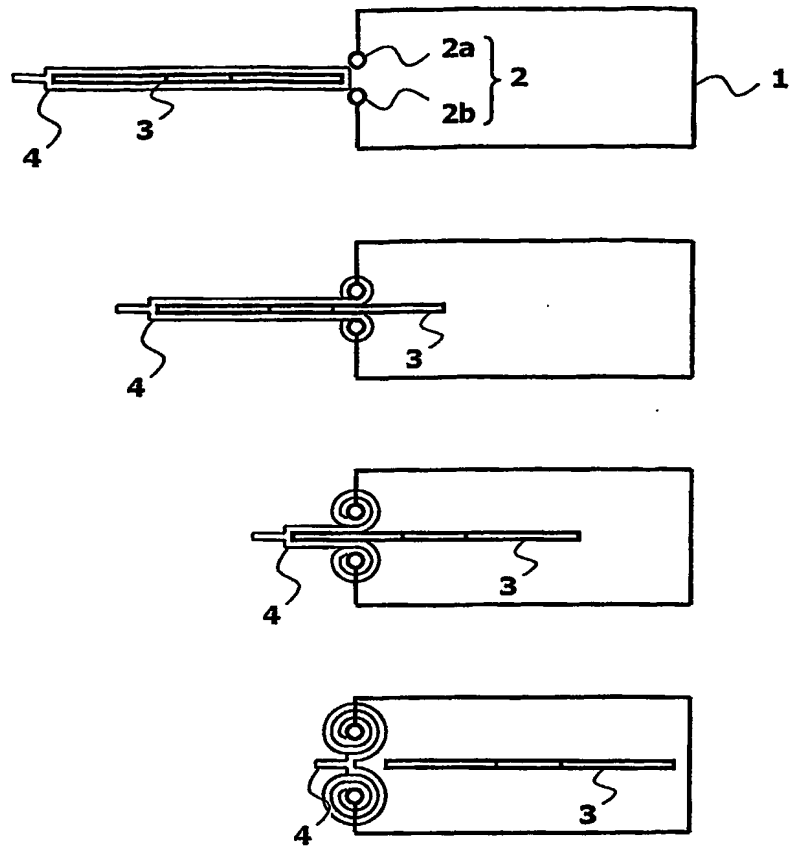


FIG. 1

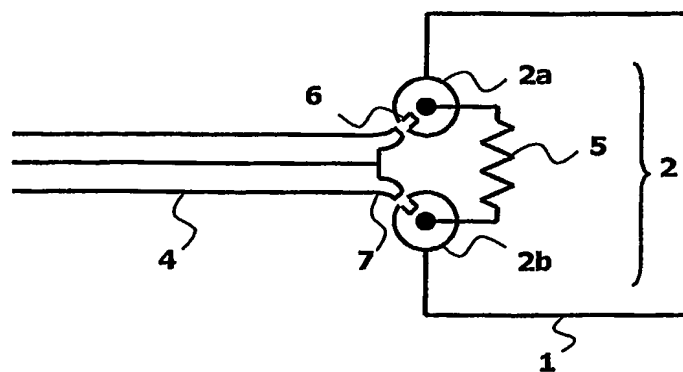


FIG. 2

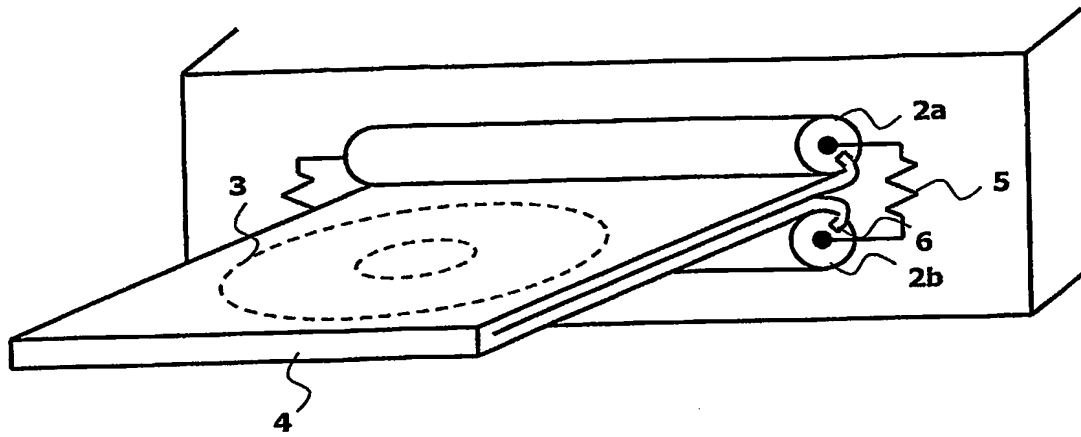


FIG. 3

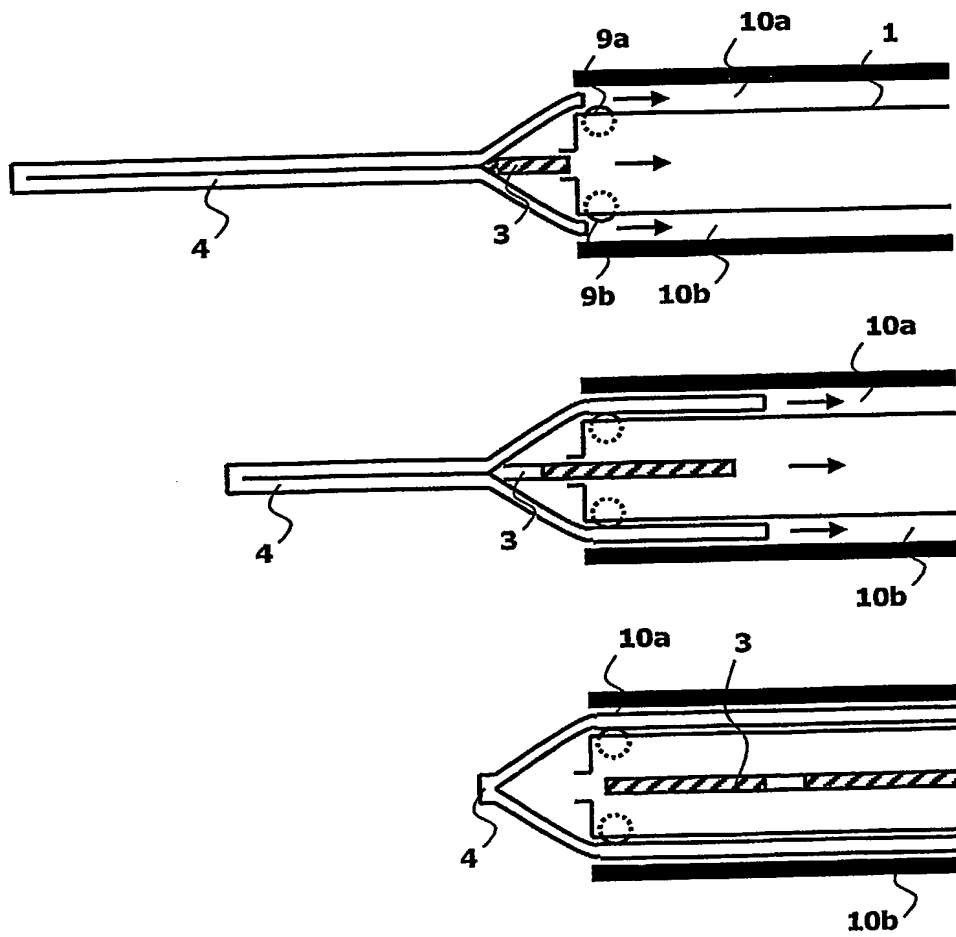


FIG. 4

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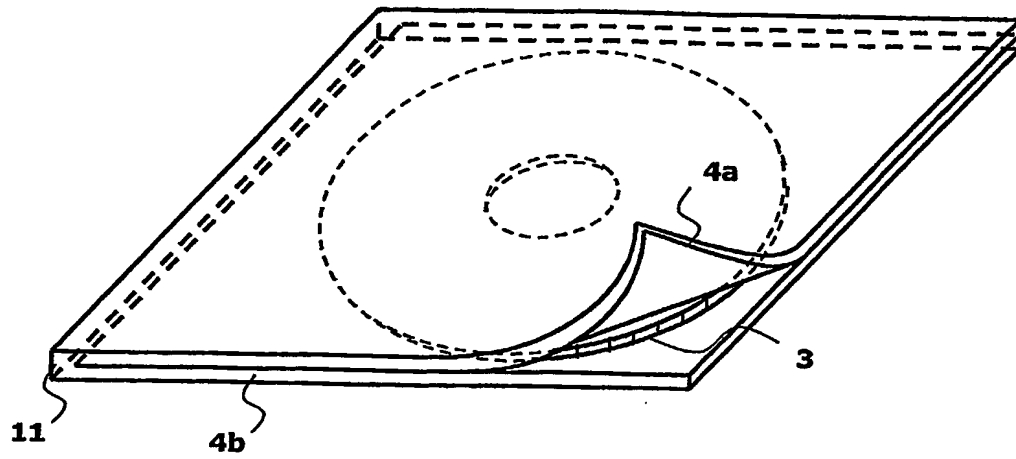


FIG. 5

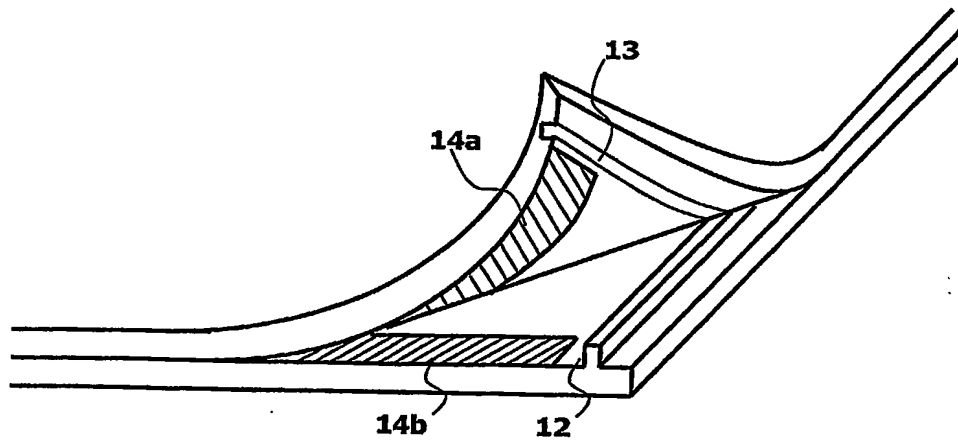


FIG. 6



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